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LAKE SPRINGFIELD, SANGAMON COUNTY, ILLINOIS

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NATIONAL EUTROPHICATION SURVEY

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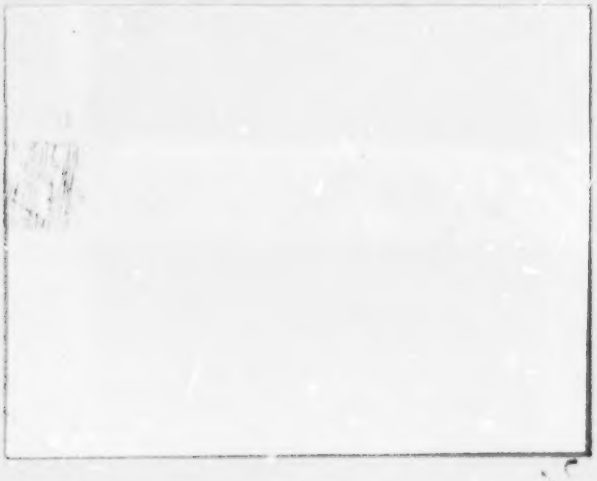

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REPORT
ON
LAKE SPRINGFIELD
SANGAMON COUNTY
ILLINOIS
EPA REGION V
WORKING PAPER No. 317

WITH THE COOPERATION OF THE
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
AND THE
ILLINOIS NATIONAL GUARD
JUNE, 1975

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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivded according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Illinois Environmental Protection Agency for professional involvement and to the Illinois National Guard for conducting the tributary sampling phase of the Survey.

Dr. Richard H. Briceland, Director of the Illinois Environmental Protection Agency; and Ronald M. Barganz, State Survey Coordinator, and John J. Forneris, Manager of Region III, Field Operations Section of the Division of Water Pollution Control, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

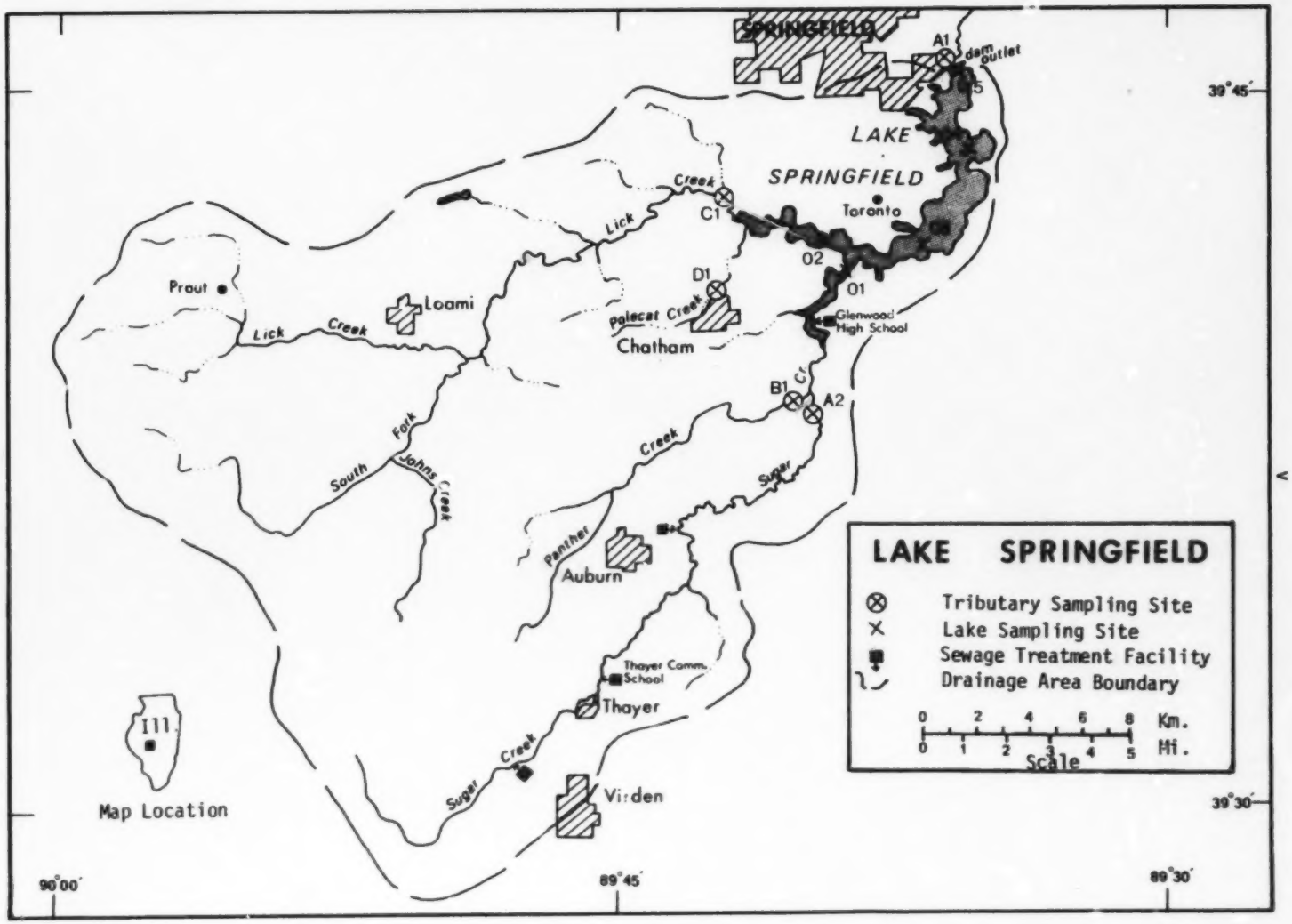
Major General Harold R. Patton, the Adjutant General of Illinois, and Project Officer Colonel Daniel L. Fane, who directed the volunteer efforts of the Illinois National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ILLINOIS

LAKE NAME	COUNTY
Baldwin	Randolph
Bloomington	McLean
Carlyle	Bond, Clinton, Fayette
Cedar	Lake
Charleston	Coles
Coffeen	Montgomery
Crab Orchard	Jackson, Williamson
Decatur	Macon
DePue	Bureau
East Loon	Lake
Fox	Lake
Grass	Lake
Highland Silver	Madison
Holiday	LaSalle
Horseshoe	Madison
Long	Lake
Lou Yaeger	Montgomery
Marie	Lake
Old Ben Mine	Franklin
Pistakee	Lake, McHenry
Raccoon	Marion
Rend	Franklin, Jefferson
Sangchris	Christian
Shelbyville	Moultrie, Shelby
Slocum	Lake
Springfield	Sangamon
Storey	Knox
Vandalia	Fayette
Vermilion	Vermilion
Wee Ma Tuk	Fulton
Wonder	McHenry


SPRINGFIELD
A1
dam outlet
39°45'
LAKE
SPRINGFIELD
Toronto
Creek
Lick
C1
02
01
D1
Polecat Creek
Chatham
Glenwood High School
Prout
Loami
Lick Creek
B1
C1
A2
South Fork
Johns Creek
Sugar Creek
Panther
Auburn
Thayer Comm. School
Thayer
Virden
Sugar Creek
Map Location
Ill.
39°30'
90°00'
89°45'
89°30'
LAKE SPRINGFIELD
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
0 2 4 6 8 Km.
0 1 2 3 4 5 Mi.
Scale

LAKE SPRINGFIELD

STORET NO. 1742

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Lake Springfield is eutrophic. It ranked seventeenth in overall trophic quality when the 31 Illinois lakes sampled in 1973 were compared using a combination of six parameters*. Fourteen lakes had less median total phosphorus, 19 had less median dissolved phosphorus, 24 had less median inorganic nitrogen, eight had less mean chlorophyll a, and 20 had greater mean Secchi disc transparency. Depression of dissolved oxygen with depth occurred at sampling station 4 in August and October and at station 5 in August.

Survey limnologists noted some blue-green algae along the shoreline near station 5 in October and reported the occurrence of many patches of emergent macrophytes near the other sampling stations in August and October.

B. Rate-Limiting Nutrient:

The algal assay results indicate that Lake Springfield was phosphorus limited at the time the sample was collected (05/07/73). This finding is substantiated by the lake data (the mean N/P ratios were 26/1 or greater at all sampling times).

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* See Appendix A.

C. Nutrient Controllability:

1. Point sources--The phosphorus contribution of known point sources amounted to 27.7% of the total load reaching Lake Springfield during the sampling year. However, the non-point source export of Polecat Creek (see page 14) was substantially higher than the other streams in the drainage basin; and it is likely that other point sources (e.g., Chatham) contributed significantly to the phosphorus load to Lake Springfield. The known point sources which contributed to the overall phosphrous load include Glenwood High School (13.1%), Virden (7.8%), Auburn (6.5%), and Thayer Community School (0.3%).

The present phosphorus loading rate of 1.70 $g/m^2/yr$ is over three times the rate proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic rate (see page 14). A 100% reduction in phosphorus loads from the above point sources would only reduce the overall loading rate to 1.23 $g/m^2/yr$ (about twice the eutrophic rate). However, because the lake is phosphorus limited, all phosphorus inputs should be minimized to the greatest practicable extent to slow the eutrophication of Lake Springfield.

2. Non-point sources--About 72% of the total annual phosphorus input to Lake Springfield is attributed to non-point sources. After accounting for the point sources, Sugar Creek

contributed 23.2%; Lick Creek, 31.2%; Polecat Creek, 6.4%; and Panther Creek, 4.2% of the total phosphorus input. Ungaged tributaries were estimated to have contributed 6.3% of the total load.

As discussed above, the high non-point phosphorus export of Polecat Creek (98 kg/km^2/yr) may, in part, be attributable to point sources (e.g., Chatham) rather than to non-point source contributions.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 17.13 kilometers^2.
2. Mean depth: 4.0 meters.
3. Maximum depth: >6.1 meters.
4. Volume: 68.288 x 10^6 m^3.
5. Mean hydraulic retention time: 176 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Sugar Creek	165.5	1.1
Panther Creek	61.6	0.4
Lick Creek	326.3	2.1
Polecat Creek	19.0	0.1
Minor tributaries & immediate drainage -	91.7	0.8
Totals	664.1	4.5

2. Outlet -

Sugar Creek	681.2**	4.5

C. Precipitation***:

1. Year of sampling: 114.3 centimeters.
2. Mean annual: 88.1 centimeters.

---

† Table of metric conversions--Appendix B.
†† Forneris, 1973.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Lake Springfield was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from five stations on the lake and from two or more depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 1.5 meters at station 1, 1.8 meters at station 2, 3.4 meters at station 3, 5.5 meters at station 4, and 6.1 meters at station 5.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE SPRINGFIELD
STORET CODE 1742

PARAMETER	1ST SAMPLING (5/ 7/73) 5 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 9/73) 5 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/18/73) 5 SITES RANGE	MEAN	MEDIAN
TEMP (C)	16.1 - 17.6	16.7	16.4	26.7 - 31.4	27.8	27.5	16.9 - 21.8	19.4	20.1
DISS OXY (MG/L)	8.2 - 9.2	8.5	8.5	4.2 - 8.6	6.2	6.0	6.2 - 10.0	8.3	8.3
CNDCTVY (MCROMO)	345. - 520.	408.	365.	362. - 439.	391.	381.	300. - 330.	318.	318.
PH (STAND UNITS)	8.0 - 8.2	8.1	8.1	7.8 - 8.7	8.1	8.0	8.2 - 8.7	8.5	8.4
TOT ALK (MG/L)	102. - 173.	121.	105.	112. - 147.	126.	120.	124. - 168.	139.	128.
TOT P (MG/L)	0.148 - 0.216	0.176	0.170	0.067 - 0.151	0.101	0.100	0.075 - 0.145	0.095	0.086
ORTHO P (MG/L)	0.080 - 0.105	0.096	0.100	0.022 - 0.071	0.052	0.055	0.025 - 0.061	0.046	0.053
NO2+NO3 (MG/L)	5.050 - 8.400	6.142	5.330	2.810 - 3.540	3.188	3.235	0.040 - 1.770	1.165	1.490
AMMONIA (MG/L)	0.080 - 0.170	0.142	0.160	0.020 - 0.160	0.076	0.070	0.020 - 0.050	0.036	0.040
KJEL N (MG/L)	0.400 - 0.600	0.523	0.500	0.600 - 1.300	0.886	0.950	0.200 - 1.380	0.631	0.500
INORG N (MG/L)	5.210 - 8.480	6.284	5.490	2.950 - 3.630	3.264	3.265	0.080 - 1.810	1.201	1.520
TOTAL N (MG/L)	5.550 - 8.890	6.665	5.850	3.860 - 4.460	4.074	4.020	1.140 - 2.470	1.795	1.950
CHLRPYL A (UG/L)	1.7 - 12.2	5.2	2.0	12.7 - 18.1	16.4	17.3	7.2 - 31.6	17.4	13.5
SECCHI (METERS)	0.1 - 0.4	0.2	0.2	0.3 - 0.9	0.5	0.5	0.5 - 0.7	0.6	0.5

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
05/07/73	1. Melosira sp.	515
	2. Cryptomonas sp.	325
	3. Flagellates	135
	4. Pennate diatoms	81
	5. Dactylococcopsis (?) sp.	54
	Other genera	109
	Total	1,219
08/09/73	1. Melosira sp.	2,179
	2. Stephanodiscus sp. and Cyclotella sp.	812
	3. Nitzschia sp.	209
	4. Cryptomonas sp.	93
	5. Flagellates	93
	Other genera	393
	Total	3,779
10/18/73	1. Melosira sp.	2,264
	2. Nitzschia sp.	906
	3. Stephanodiscus sp.	483
	4. Kirchneriella sp.	453
	5. Microcystis sp.	302
	Other genera	1,238
	Total	5,646

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
05/07/73	01	8.4
	02	12.2
	03	1.9
	04	1.7
	05	2.0
08/09/73	01	18.1
	02	17.3
	03	12.7
	04	16.8
	05	17.3
10/17-18/73	01	23.0
	02	31.6
	03	13.5
	04	11.5
	05	7.2

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.045	5.760	18.2
0.050 P	0.095	5.760	44.7
0.050 P + 1.0 N	0.095	6.760	45.3
1.0 N	0.045	6.760	17.6

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Lake Springfield was high at the time the sample was collected (05/07/73). A significant increase in yield occurred

with the addition of orthophosphorus alone, but the addition of only nitrogen did not result in a significant difference in yield as compared to the control. Therefore, phosphorus limitation is indicated.

The lake data also indicate phosphorus limitation. At all sampling times, the ratios of inorganic nitrogen to orthophosphorus were 26 to 1 or greater.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Illinois National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in June, 1973, and was completed in May, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Illinois District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the nutrient loads, in $kg/km^2/year$, at station B-1 and multiplying by the ZZ area in km^2.

The operator of the Auburn wastewater treatment plant provided monthly effluent samples and corresponding flow data. The treatment plant operators of Virden, Thayer Community School, and Glenwood High

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* See Working Paper No. 175.

School did not participate in the Survey, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Auburn	2,525	trickling filter	695.5	Sugar Creek
Glenwood High	3,375*	act. sludge	1,277.4**	Lake Springfield
Thayer Community School	79*	sand filter	29.9**	Sugar Creek
Virden	2,000***	trickling filter	757.0**	Sugar Creek

2. Known industrial - None

* Anonymous, 1972 (pop. given is 37.5% of actual population attending the school).
** Estimated at 0.3785 m^3/capita/day.
*** Anonymous, 1972.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Sugar Creek	6,755	23.2
Panther Creek	1,235	4.2
Lick Creek	9,095	31.2
Polecat Creek	1,860	6.4
b. Minor tributaries & immediate drainage (non-point load) -	1,835	6.3
c. Known municipal STP's -		
Auburn	1,885	6.5
Glenwood High School	3,825	13.1
Thayer Community School	90	0.3
Virden	2,270	7.8
d. Septic tanks - Unknown	-	-
e. Known industrial - None	-	-
f. Direct precipitation* -	300	1.0
Total	29,150	100.0

2. Outputs -

Lake outlet - Sugar Creek 21,720

3. Net annual P accumulation - 7,430 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Sugar Creek	242,480	22.1
Panther Creek	97,480	8.9
Lick Creek	533,530	48.7
Polecat Creek	34,690	3.2
b. Minor tributaries & immediate drainage (non-point load) -	145,070	13.3
c. Known municipal STP's -		
Auburn	4,640	0.4
Glenwood High School	11,480	1.0
Thayer Community School	270	<0.1
Virden	6,800	0.6
d. Septic tanks - Unknown	-	-
e. Known industrial - None	-	-
f. Direct precipitation* -	18,495	1.7
Total	1,094,935	100.0

2. Outputs -

Lake outlet - Sugar Creek 718,340

3. Net annual N accumulation - 376,595 kg.

* See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Sugar Creek	41	1,465
Panther Creek	20	1,582
Lick Creek	28	1,635
Polecat Creek	98	1,826

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	1.70	0.43	63.9	22.0

Vollenweider loading rates for phosphorus (g/m²/yr) based on mean depth and mean hydraulic retention time of Lake Springfield:

"Dangerous" (eutrophic rate)	0.56
"Permissible" (oligotrophic rate)	0.28

V. LITERATURE REVIEWED

Anonymous, 1972. Wastewater treatment works data book. IL Env. Prot. Agency, Springfield.

Forneris, John J., 1973. Personal communication (lake morphometry). IL Env. Prot. Agency, Springfield.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1703	LAKE BLOOMINGTON	0.058	5.730	464.667	26.200	14.800	0.020
1706	LAKE CARLYLE	0.084	1.270	477.889	17.367	11.000	0.032
1708	LAKE CHARLESTON	0.160	4.680	490.667	12.000	8.400	0.065
1711	COFFEEN LAKE	0.032	0.260	456.222	7.700	14.900	0.012
1712	CRAB ORCHARD LAKE	0.082	0.200	482.222	59.867	13.800	0.013
1714	LAKE DECATUR	0.129	3.750	479.571	43.000	14.500	0.062
1725	LONG LAKE	0.704	1.190	482.667	49.333	8.800	0.398
1726	LAKE LOU YAEGER	0.186	1.680	489.583	10.662	11.400	0.076
1727	LAKE MARIE	0.098	0.370	467.667	39.533	14.700	0.057
1733	PISTAKEE LAKE	0.203	0.370	485.667	75.867	7.000	0.052
1735	REND LAKE	0.071	0.210	471.500	23.533	12.700	0.012
1739	LAKE SHELBYVILLE	0.062	3.290	461.333	17.161	14.800	0.019
1740	SILVER LAKE (HIGHLAND)	0.226	0.970	489.500	5.822	14.800	0.057
1742	LAKE SPRINGFIELD	0.108	3.265	483.385	13.013	10.800	0.059
1748	VERMILION LAKE	0.109	4.695	481.500	31.150	14.200	0.050
1750	WONDER LAKE	0.426	0.890	486.000	98.533	7.800	0.132
1751	LAKE STORY	0.072	2.510	459.333	17.250	14.800	0.021
1752	DEPUE LAKE	0.438	4.050	490.000	58.833	7.600	0.276
1753	LAKE SANGCHRIS	0.050	1.970	475.417	19.292	14.500	0.009
1754	LAKE HOLIDAY	0.167	3.135	485.167	51.217	7.200	0.046
1755	FOX LAKE	0.219	0.375	486.167	63.850	8.800	0.083
1756	GRASS LAKE	0.301	0.820	481.000	83.500	5.900	0.093
1757	EAST LOON LAKE	0.076	0.120	450.000	22.300	14.900	0.018
1758	SLOCUM LAKE	0.865	0.200	487.333	221.100	5.800	0.362
1759	CEDAR LAKE	0.029	0.170	400.333	5.767	12.800	0.013
1761	LAKE WEMATUK	0.069	1.770	466.333	7.967	14.500	0.031
1762	RACCOON LAKE	0.106	0.310	484.333	19.217	13.800	0.020
1763	BALDWIN LAKE	0.044	0.140	461.167	11.333	13.200	0.007

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	1s-MIN DO	MEDIAN DISS ORTHO P
1764	LAKE VANDALIA	0.116	0.480	478.111	11.276	14.800	0.023
1765	OLD BEN MINE RESERVOIR	0.930	0.205	478.333	31.433	11.200	0.575
1766	HORSESHOE LAKE	0.127	0.705	482.833	182.250	6.800	0.018

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1703	LAKE BLOOMINGTON	88 (26)	0 (0)	80 (24)	47 (14)	13 (2)	68 (20)	296
1706	LAKE CARLYLE	63 (19)	40 (12)	63 (19)	63 (19)	63 (19)	53 (16)	345
1708	LAKE CHARLESTON	37 (11)	7 (2)	0 (0)	77 (23)	77 (23)	27 (8)	225
1711	COFFEEN LAKE	97 (29)	77 (23)	93 (28)	93 (28)	2 (0)	92 (27)	454
1712	CRAB ORCHARD LAKE	67 (20)	90 (27)	43 (13)	20 (6)	42 (12)	85 (25)	347
1714	LAKE DECATUR	40 (12)	13 (4)	53 (16)	33 (10)	30 (8)	32 (9)	201
1725	LONG LAKE	7 (2)	43 (13)	40 (12)	30 (9)	72 (21)	3 (1)	195
1726	LAKE LOU YAEGER	30 (9)	37 (11)	7 (2)	87 (26)	57 (17)	23 (7)	241
1727	LAKE MARIE	60 (18)	68 (20)	73 (22)	37 (11)	23 (7)	42 (12)	303
1733	PISTAKEE LAKE	27 (8)	68 (20)	23 (7)	13 (4)	90 (27)	32 (9)	253
1735	REND LAKE	77 (23)	80 (24)	70 (21)	50 (15)	53 (16)	92 (27)	422
1739	LAKE SHELBYVILLE	83 (25)	17 (5)	83 (25)	70 (21)	13 (2)	73 (22)	339
1740	SILVER LAKE (HIGHLAND)	20 (6)	47 (14)	10 (3)	97 (29)	13 (2)	42 (12)	229
1742	LAKE SPRINGFIELD	53 (16)	20 (6)	33 (10)	73 (22)	67 (20)	37 (11)	283
1748	VERMILION LAKE	50 (15)	3 (1)	47 (14)	43 (13)	37 (11)	47 (14)	227
1750	WONDER LAKE	13 (4)	50 (15)	20 (6)	7 (2)	80 (24)	13 (4)	183
1751	LAKE STORY	73 (22)	27 (8)	90 (27)	67 (20)	13 (2)	63 (19)	333
1752	DEPUE LAKE	10 (3)	10 (3)	3 (1)	23 (7)	83 (25)	10 (3)	139
1753	LAKE SANGCHRIS	88 (26)	30 (9)	67 (20)	57 (17)	30 (8)	97 (29)	369
1754	LAKE HOLIDAY	33 (10)	23 (7)	27 (8)	27 (8)	87 (26)	50 (15)	247
1755	FOX LAKE	23 (7)	63 (19)	17 (5)	17 (5)	72 (21)	20 (6)	212
1756	GRASS LAKE	17 (5)	53 (16)	50 (15)	10 (3)	97 (29)	17 (5)	244
1757	EAST LOON LAKE	70 (21)	100 (30)	97 (29)	53 (16)	2 (0)	77 (23)	349
1758	SLOCUM LAKE	3 (1)	87 (26)	13 (4)	0 (0)	100 (30)	7 (2)	210
1759	CEDAR LAKE	100 (30)	93 (28)	100 (30)	100 (30)	50 (15)	85 (25)	528
1761	LAKE WEMATUK	80 (24)	33 (10)	77 (23)	90 (27)	30 (8)	57 (17)	367
1762	RACCOON LAKE	57 (17)	73 (22)	30 (9)	60 (18)	42 (12)	68 (20)	330
1763	BALDWIN LAKE	93 (28)	97 (29)	87 (26)	80 (24)	47 (14)	100 (30)	504

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1764	LAKE VANDALIA	47 (14)	60 (18)	60 (18)	83 (25)	13 (2)	60 (18)	323
1765	OLD BEN MINE RESERVOIR	0 (0)	83 (25)	57 (17)	40 (12)	60 (18)	0 (0)	240
1766	HORSESHOE LAKE	43 (13)	57 (17)	37 (11)	3 (1)	93 (28)	80 (24)	313

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1759	CEDAR LAKE	528
2	1763	BALDWIN LAKE	504
3	1711	COFFEEN LAKE	454
4	1735	RENO LAKE	422
5	1757	EAST LOON LAKE	399
6	1753	LAKE SANGCHRIS	369
7	1761	LAKE WENATUK	367
8	1712	CRAB ORCHARD LAKE	347
9	1706	LAKE CARLYLE	345
10	1739	LAKE SHELBYVILLE	339
11	1751	LAKE STORY	333
12	1762	RACCOON LAKE	330
13	1764	LAKE VANDALIA	323
14	1766	HORSESHOE LAKE	313
15	1727	LAKE MARIE	303
16	1703	LAKE BLOOMINGTON	296
17	1742	LAKE SPRINGFIELD	283
18	1733	PISTAKEE LAKE	253
19	1754	LAKE HOLIDAY	247
20	1756	GRASS LAKE	244
21	1726	LAKE LOU YAEGER	241
22	1765	OLD BEN MINE RESERVOIR	240
23	1740	SILVER LAKE (HIGHLAND)	229
24	1748	VERMILION LAKE	227
25	1708	LAKE CHARLESTON	225
26	1755	FOX LAKE	212
27	1758	SLOCUM LAKE	210
28	1714	LAKE DECATUR	201

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1725	LONG LAKE	195
30	1750	WONDER LAKE	183
31	1752	DEPUE LAKE	139

Appendix B

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1742 LAKE SPRINGFIELD

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 681.2

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1742A1	681.2	4.70	6.60	8.41	8.72	6.88	5.61	3.51	1.85	1.38	1.60	2.21	2.58	4.49
1742A2	165.5	1.08	1.61	2.00	2.07	1.63	1.36	0.82	0.43	0.31	0.34	0.49	0.58	1.05
1742B1	61.6	0.39	0.60	0.74	0.76	0.59	0.51	0.30	0.16	0.11	0.11	0.17	0.21	0.39
1742C1	326.3	2.19	3.17	3.99	4.13	3.26	2.68	1.65	0.87	0.63	0.71	1.01	1.19	2.12
1742D1	19.0	0.11	0.19	0.22	0.23	0.18	0.15	0.09	0.05	0.03	0.03	0.05	0.06	0.12
1742ZZ	108.8	0.92	1.03	1.45	1.53	1.23	0.91	0.65	0.36	0.31	0.41	0.49	0.54	0.82

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 681.2
SUM OF SUB-DRAINAGE AREAS = 681.3
TOTAL FLOW IN = 54.05
TOTAL FLOW OUT = 54.05

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1742A1	6	73	28.32	3	7.79				
	7	73	28.32	8	0.34				
	8	73	0.0	19	0.0				
	9	73	0.0	8	0.0				
	10	73	0.0	14	0.0				
	11	73	0.0	3	0.0				
	12	73	0.0	2	0.0				
	1	74	12.74	5	3.14				
	2	74	12.18	2	11.38	16	8.47		
	3	74	8.50	2	18.21	16	8.01		
	4	74	9.88	6	7.02				
	5	74	3.68	4	0.0				
1742A2	6	73	7.19	3	1.05				
	7	73	3.96	8	1.42				
	8	73	0.28	19	0.16				
	9	73	0.01	8	0.0				
	10	73	0.02	14	0.01				
	11	73	0.09	3	0.02				
	12	73	0.22	2	0.65				
	1	74	3.09	5	0.74				
	2	74	3.11	2	3.26	16	1.81		
	3	74	2.01	2	3.45	16	3.60		
	4	74	2.32	6	2.72				
	5	74	0.85	4	1.25				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1742 LAKE SPRINGFIELD

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1742B1	6	73	2.69	3	0.40				
	7	73	1.44	8	0.51				
	8	73	0.11	19	0.06				
	9	73	0.01	8	0.0				
	10	73	0.01	14	0.00				
	11	73	0.03	3	0.01				
	12	73	0.08	2	0.23				
	1	74	1.10	5	0.26				
	2	74	1.16	2	1.22	16	0.68		
	3	74	0.74	2	1.27	16	1.33		
	4	74	0.85	6	0.99				
	5	74	0.31	4	0.45				
1742C1	6	73	14.19	3	2.04				
	7	73	7.99	8	1.70				
	8	73	0.62	19	0.31				
	9	73	0.03	8	0.0				
	10	73	0.04	14	0.01				
	11	73	0.19	3	0.04				
	12	73	0.45	2	1.33				
	1	74	6.26	5	1.47				
	2	74	6.14	2	6.43	16	3.54		
	3	74	4.02	2	6.88	16	7.19		
	4	74	4.67	6	5.47				
	5	74	1.73	4	2.46				
1742D1	6	73	0.82	3	0.1[illegible]				
	7	73	0.42	8	0.1[illegible]				
	8	73	0.03	19	0.02				
	9	73	0.0	8	0.0				
	10	73	0.0	14	0.0				
	11	73	0.01	3	0.00				
	12	73	0.02	2	0.07				
	1	74	0.34	5	0.08				
	2	74	0.37	2	0.37	16	0.21		
	3	74	0.22	2	0.40	16	0.40		
	4	74	0.26	6	0.31				
	5	74	0.09	4	0.14				
1742ZZ	6	73	4.70	3	0.68				
	7	73	1.95	8	0.91				
	8	73	0.20	19	0.10				
	9	73	0.01	8	0.0				
	10	73	0.01	14	0.01				
	11	73	0.06	3	0.01				
	12	73	0.14	2	0.42				
	1	74	2.04	5	0.48				
	2	74	2.04	2	2.15	16	1.19		
	3	74	1.33	2	2.29	16	2.38		
	4	74	1.53	6	1.81				
	5	74	0.57	4	0.82				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/10/23

174201
39 41 14.0 089 38 58.0
LAKE SPRINGFIELD
17167 ILLINOIS

11EPALES
3

2111202
0007 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	09 40	0000	16.1		15	520	8.10	148	0.140	0.500	8.100	0.084
	09 40	0005	16.1	8.6		520	8.10	149	0.130	0.500	8.190	0.083
73/08/09	12 25	0000	28.1		12	439	7.80	147	0.140	1.100	2.810	0.048
	12 25	0004	27.6	5.2		437	7.80	146	0.160	1.000	2.960	0.050
73/10/18	10 55	0000	17.0			329	8.70	151	0.040	1.200	0.160	0.026
	10 55	0003	17.0	10.0		328	8.60	157	0.030	1.200	0.080	0.025

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	09 40	0000	0.158	8.4
	09 40	0005	0.159	
73/08/09	12 25	0000	0.137	18.1
	12 25	0004	0.151	
73/10/18	10 55	0000	0.086	23.0
	10 55	0003	0.145	

STORET RETRIEVAL DATE 75/10/23

174202
39 42 00.0 089 39 22.0
LAKE SPRINGFIELD
17167 ILLINOIS

11EPALES
3

2111202
0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 N02&N03 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	10 10	0000	16.2		6	520	8.20	171	0.080	0.500	8.390	0.087
	10 10	0006	16.1	9.2		520	8.20	173	0.080	0.400	8.400	0.080
73/08/09	12 05	0000	27.9	4.4	12	421	7.90	145	0.130	1.000	2.940	0.053
	12 05	0005	27.2	5.0		428	7.90	147	0.100	1.000	2.860	0.056
73/10/18	11 15	0000	17.1		19	330	8.70	162	0.040	1.300	0.070	0.028
	11 15	0005	16.9	8.8		330	8.60	166	0.040	1.100	0.040	0.036

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	10 10	0000	0.153	12.2
	10 10	0006	0.148	
73/08/09	12 05	0000	0.125	17.3
	12 05	0005	0.124	
73/10/18	11 15	0000	0.102	31.6
	11 15	0005	0.145	

STORET RETRIEVAL DATE 75/10/23

174203
39 41 52.0 089 36 46.0
LAKE SPRINGFIELD
17165 ILLINOIS

11EPALES
3

2111202
0014 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	10 30	0000	16.4		4	355	8.10	103	0.140	0.600	5.170	0.103
	10 30	0004	16.4	8.2		345	8.10	102	0.160	0.500	5.050	0.103
	10 30	0011	16.4	8.4		350	8.10	102	0.160	0.600	5.100	0.105
73/08/09	11 45	0000	27.1	6.6	18	393	8.10	128	0.070	0.900	3.440	0.071
	11 45	0010	26.9	6.7		386	8.10	126	0.090	0.600	3.540	0.066
73/10/18	11 30	0000	18.3		18	300	8.40	130	0.030	0.500	1.490	0.058
	11 30	0010	18.2	8.8		300	8.30	128	0.040	0.500	1.410	0.053

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	10 30	0000	0.216	1.9
	10 30	0004	0.205	
	10 30	0011	0.195	
73/08/09	11 45	0000	0.108	12.7
	11 45	0010	0.108	
73/10/18	11 30	0000	0.095	13.5
	11 30	0010	0.097	

STORET RETRIEVAL DATE 75/10/23

174204
39 43 51.0 089 35 19.0
LAKE SPRINGFIELD
17167 ILLINOIS

11EPALES
3

2111202
0020 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	11 00	0000	16.8		5	360	8.10	103	0.160	0.600	5.140	0.098
	11 00	0004	16.8	8.6		360	8.10	103	0.160	0.500	5.150	0.098
	11 00	0016	16.8	8.6		355	8.00	104	0.160	0.500	5.130	0.100
73/08/09	11 05	0000	28.3	8.6	36	368	8.70	114	0.020	1.000	3.230	0.030
	11 05	0005	27.8	7.2		380	8.30	120	0.070	0.600	3.340	0.059
	11 05	0015	26.9	6.0		368	8.00	119	0.070	0.700	3.310	0.061
	11 05	0018	26.7	4.2		368	7.90	119	0.040	0.800	3.240	0.062
73/10/17	18 10	0000	20.7		29	314	8.60	126	0.040	0.500	1.730	0.056
	18 10	0005	20.7	9.6		312	8.60	125	0.020	0.300	1.720	0.051
	18 10	0012	20.1	6.2		310	8.40	168	0.050	0.200K	1.390	0.031

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	11 00	0000	0.177	1.7
	11 00	0004	0.170	
	11 00	0016	0.188	
73/08/09	11 05	0000	0.074	16.8
	11 05	0005	0.083	
	11 05	0015	0.094	
	11 05	0018	0.106	
73/10/17	18 10	0000	0.090	11.5
	18 10	0005	0.079	
	18 10	0012	0.086	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

174205
39 45 33.0 089 35 46.0
LAKE SPRINGFIELD
17167 ILLINOIS

11EPALES
3

2111202
0015 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	11 20	0000	17.6		8	370	8.10	105	0.160	0.500	5.350	0.101
	11 20	0004	17.6	8.4		365	8.10	106	0.170	0.600	5.330	0.100
	11 20	0011	17.6	8.4		365	8.10	106	0.140	0.500	5.350	0.103
73/08/09	10 35	0000	31.4	8.2	34	382	8.30	113	0.040	1.300	3.160	0.022
	10 35	0010	29.4	7.6		373	8.60	112	0.050	1.000	3.180	0.030
	10 35	0015	27.4	6.0		365	8.10	115	0.040	0.700	3.330	0.055
	10 35	0020	26.9	4.6		362	7.80	115	0.040	0.700	3.290	0.059
73/10/17	17 00	0000	21.8			320	8.40	126	0.040	0.700	1.770	0.058
	17 00	0005	21.6	7.6		321	8.30	124	0.030	0.300	1.770	0.058
	17 00	0010	21.4	7.8		318	8.30	124	0.040	0.200	1.760	0.061
	17 00	0015	21.1	7.4		316	8.20	126	0.030	0.200K	1.750	0.060

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	11 20	0000	0.180	2.0
	11 20	0004	0.165	
	11 20	0011	0.170	
73/08/09	10 35	0000	0.080	17.3
	10 35	0010	0.067	
	10 35	0015	0.078	
	10 35	0020	0.084	
73/10/17	17 00	0000	0.078	7.2
	17 00	0005	0.078	
	17 00	0010	0.077	
	17 00	0015	0.075	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/10/23

1742A1
39 45 40.0 089 36 00.0
SUGAR CREEK
17119 7.5 E SPRINGFIEL
O/LAKE SPRINGFIELD
BANK SAMPLE JUST BELO SPAULDING DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	12	00	4.600	1.120	0.032	0.126	0.155
73/07/08	11	05	4.300	1.760	0.080	0.120	0.173
73/08/19	11	00	2.700	1.300	0.042	0.061	0.075
73/09/08	11	30	2.100	0.700	0.031	0.072	0.085
73/10/14	08	35	1.520	0.200	0.032	0.065	0.080
73/11/03	11	15	1.280	0.400	0.052	0.078	0.078
73/12/02	10	15	1.040	0.500	0.016	0.048	0.060
74/01/05	10	45	1.010	0.700	0.040	0.032	0.065
74/02/02	15	00	4.200	0.900	0.110	0.110	0.170
74/02/16	09	15	4.620	1.000	0.110	0.115	0.170
74/03/02	10	15	5.700	1.000	0.075	0.100	0.160
74/03/16	10	30	6.200	0.600	0.050	0.100	0.140
74/04/06	10	30	5.800	0.700	0.030	0.090	0.110
74/05/04	10	30	5.200	1.000	0.040	0.060	0.065

STORET RETRIEVAL DATE 75/10/23

1742A2
39 38 25.0 089 39 44.0
SUGAR CREEK
17 7.5 CHATHAM
I/LAKE SPRINGFIELD
SEC RD BRDG .8 MI S OF INTERSTATE 55
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	09 30		7.200	1.980	0.086	0.252	0.430
73/07/08	09 20		8.900	1.100	0.095	0.220	0.310
73/08/19	09 10		2.400	1.150	0.011	0.230	0.345
73/09/08	09 15		0.690	1.540	0.350	0.231	0.390
73/10/14	08 35		0.600	1.550	0.198	0.390	0.665
73/11/03	09 20		1.720		1.900	1.500	2.300
73/12/02	08 40		3.500	1.000	0.148	0.700	0.800
74/01/05	08 50		4.100	0.800	0.104	0.124	0.180
74/02/02	13 40		8.800	0.400	0.075	0.085	0.135
74/02/16	08 45		7.900	0.700	0.105	0.115	0.190
74/03/02	09 00		7.900	1.200	0.065	0.080	0.220
74/03/16	08 55		8.100	0.700	0.070	0.100	0.210
74/04/06	09 10		6.900	1.100	0.080	0.125	0.330
74/05/04	08 35		7.600	1.000	0.080	0.135	0.277

STORET RETRIEVAL DATE 75/10/23

174281
39 38 44.0 089 40 20.0
PANTHER CREEK
17 7.5 CHATHAM
T/LAKE SPRINGFIELD
SEC RD BRDG .5 MI UPSTREAM CON SUGAR CK
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	09 30		8.700	2.200	0.126	0.069	0.230
73/07/08	09 15		5.100	0.700	0.060	0.048	0.095
73/08/19	09 05		3.200	2.100	0.108	0.069	0.150
73/09/08	08 55		0.540	2.100	0.357	0.083	0.210
73/10/14	08 25		0.460	1.100	0.132	0.076	0.180
73/11/03	09 10		1.200	0.950	0.042	0.050	0.130
73/12/02	08 50		5.600	0.600	0.020	0.032	0.055
74/01/05	08 40		9.500	0.200	0.024	0.032	0.055
74/02/02	13 30		10.000	0.300	0.040	0.045	0.055
74/02/16	08 40		9.300	0.500	0.030	0.030	0.060
74/03/02	08 55		9.800	0.600	0.020	0.045	0.095
74/03/16	08 50		9.500	0.400	0.030	0.045	0.075
74/04/06	09 05		8.500	0.400	0.020	0.030	0.030
74/05/04	08 20		9.000	0.100K	0.052	0.042	0.120

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1742C1
39 42 55.0 089 42 10.0
LICK CREEK
17 7.5 CHATHAM
T/LAKE SPRINGFIELD
HWY 4 BRDG 2 MI S OF US 36 BRDG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	08 50		7.900	1.600	0.072	0.063	0.135
73/07/08	08 50		10.700	1.320	0.078	0.060	0.120
73/08/19	08 45		3.300	2.520	0.399	0.750	0.860
73/09/08	08 15		0.710	2.600	0.250	0.074	0.210
73/10/14	08 00		0.980	1.600	0.189	0.082	0.210
73/11/03	08 35		0.750	1.100	0.035	0.138	0.280
73/12/02	08 00		5.040	1.000	0.064	0.132	0.190
74/01/05	08 05		8.800	0.400	0.028	0.040	0.055
74/02/02	13 00		9.400	0.200	0.030	0.050	0.075
74/02/16	08 15		8.400	0.400	0.035	0.040	0.070
74/03/02	08 30		8.600	0.700	0.020	0.045	0.125
74/03/16	08 25		8.600	0.600	0.030	0.045	0.125
74/04/06	08 40		7.980	0.600	0.025	0.045	0.112
74/05/04	08 00		6.500	0.500	0.135	0.065	0.190

STORET RETRIEVAL DATE 75/10/23

174201
39 41 00.0 089 42 15.0
POLECAT CREEK
17 7.5 CHATHAM
T/LAKE SPRINGFIELD
IL HWY 4 BRDG .5 MI N OF CHATHAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	09 05		7.400	2.400	0.200	0.200	0.425
73/07/08	09 00		10.900	1.470	0.084	0.160	0.250
73/08/19	08 50		2.300	3.700	0.550	1.000	1.350
73/09/08	08 35		0.011	10.000	4.400	2.500	4.500
73/10/14	08 15		2.800	1.700	0.440	0.910	1.050
73/11/03	08 50		4.600	1.350	0.350	0.881	1.112
73/12/02	08 15		6.400	1.600	0.276	0.810	0.970
74/01/05	08 25		9.600	0.900	0.160	0.336	0.430
74/02/02	13 15		10.000	0.400	0.155	0.180	0.290
74/02/16	08 25		9.100	0.800	0.200	0.195	0.300
74/03/02	08 40		9.700	1.300	0.085	0.170	0.320
74/03/16	08 35		9.850	0.500	0.030	0.040	0.090
74/04/06	08 50		8.800	1.100	0.040	0.138	0.220
74/05/04	08 15		8.400	1.400	0.085	0.135	0.250

STORET RETRIEVAL DATE 75/10/23

1742XA TF1742XA P002525
39 36 00.0 089 43 30.0
AUBURN
17119 7.5 DIVERNON
T/SPRINGFIELD
SUGAR CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/17	12 45		7.500	3.400	0.140	2.300	2.800		
73/08/20	13 00		9.200	16.500	2.960	12.200		0.176	0.176
73/09/17	10 15		5.100	18.900	5.740	8.400	9.000		0.180
73/10/17	12 55		10.800	15.500	1.260	8.500	9.700		0.180
73/11/19	12 45		8.900	19.500	4.400	13.800	16.500		0.180
73/12/17	13 00		13.000	9.300	0.130	6.400	8.600		0.170
74/01/15	12 50		11.200	3.300	0.180	4.100	5.800		0.185
74/02/18	13 30		11.000	2.000	0.100	3.600	4.700		0.190
74/03/18	12 15		8.600	1.700	0.180	5.700	6.900	0.190	
74/04/17	13 00		10.100	2.800	0.130	3.000	4.300		0.190
74/05/17	13 30		9.800	4.600	0.490	5.500	6.800		0.190
74/06/17	13 00		8.400	3.000	0.270	1.700	2.300		0.190